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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

BAREFORD, KATHERINE A

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1792

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/574,691	Applicant(s) IMAIZUMI ET AL.	
	Examiner Katherine A. Bareford	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 September 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The amendment of September 15, 2008 has been received and entered. With the entry of the amendment, claims 1-12 are canceled, and claims 13-26 are pending for examination.

Specification

2. The substitute specification filed September 15, 2008 is approved.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 13-26 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

New claim 13, lines 6-8, has been amended to provide that "... an average total area of each molten particle . . . when the molten particles have stuck to the surface of the metal body is . . .". Applicant does not indicate where support for this amendment

is provided in the disclosure as originally filed. Original claim 1 and the disclosure provide that "... an average area of each of molten particles ... when the molten particles have stuck to the surface of the thermal spray subject is ..." and does not indicate that "an average total area" is measured. As originally worded, the description of "average area" is confusing and allows for multiple interpretations. For example, the "total surface area of the entire particle" (which the Examiner understands is what applicant is now trying to claim) could be what is meant. However, the "average area" could also be the surface area of the particle that is actually stuck to the surface, that is the area that contacts the surface, since the language provides "an average area ... when the particles have stuck to the surface". There is no indication that the "total" area would be the correct understanding of what is measured, and therefore, the claim contains new matter.

The other dependent claims do not cure the defects of the claims from which they depend.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 13 and 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thermal Spraying: Practice, Theory, and Application (hereinafter TS) in view of Browning (US 4762977), Kang (US 4788077) and EITHER Maros et al (US 3052590) OR Tenkula et al (US 5123152).

TS teaches that it is well known to provide metal thermal spray coatings (aluminum bronze, zinc, aluminum, zinc-aluminum alloys, for example) on metal bodies (iron or steel, for example) for corrosion prevention. Page 53, section 5.7.3. TS further teaches that it is desirable to roughen a surface of a thermal spray subject to achieve an average roughness Ra (AA = Ra) in the range of 2.5 to 13 micrometers, and that the rate of adhesion bond strength improvement decreases above 10 micrometers,

indicating a preferred range of 2.5 to 10 micrometers. Page 22. TS describes grit blasting to perform roughening. Page 22.

Claims 22, 24: TS teaches that material for corrosion prevention to be thermally sprayed can be aluminum, or an aluminum alloy such as zinc-aluminum. Page 53, section.5.7.3.

Claims 23, 25: TS teaches the conventional sealing of these corrosion protection coatings. Page 53, section 5.7.3. TS also teaches that it is well known to seal thermal spray coatings to extend the life of aluminum and zinc corrosion preventive coatings. Page 108, section 8.1.1.

TS teaches all the features of these claims except (1) the use of the grinding tool to achieve the claimed roughness (claim 13), (2) the thermal spraying to achieve the coating with the claimed average area of molten particles after application (claims 13).

However, Browning teaches that a desirable thermal spray application method uses a transferred arc from a plasma torch where a wire or rod of coating material is fed into the arc extending axially beyond the exit. Figure 2 and column 2, lines 60-68. The material to be sprayed can be aluminum, for example. Column 6, lines 1-5. (The Examiner notes that this Browning reference corresponds to Japan 6-39682, note the claim for priority in 6-39682, indicated in applicant's specification as Patent Reference 4).

Kang teaches that in the art of thermal spraying, including plasma spraying, D-gun, flame spraying, it is well known that when a given coating is to be applied to a

given substrate, the skilled worker customarily conducts a series of trials to first determine the process conditions or parameters that optimizes properties in the coating such as adhesion of the coating to the substrate, by varying various process parameters. Column 2, lines 25-65.

Maros teaches that prior to thermal spraying, it is well known to roughen a substrate by grit blasting, grinding or the like. Column 1, lines 55-65.

Tenkula also teaches that prior to thermal spraying, it is well known to roughen a substrate by grinding or grain (grit) blasting. Column 2, lines 50-60.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to (2) modify TS to use the thermal spray method as taught by Browning to apply the thermal spray coating with an expectation of desirable coating results, as TS teaches to use thermal spraying to apply the coatings and Browning teaches a desirable thermal spray coating method. As Browning corresponds to an apparatus used by applicant to apply coating with particles in the claimed area range (see specification, paragraph [0023]), it is clear that Browning at least provides that the range of area sizes provided by the use of such a plasma spraying apparatus will overlap with that claimed. Note that MPEP 2112.02 indicates that "When the prior art device is the same as a device described in the specification for carrying out the claimed method, it can be assumed the device will inherently perform the claimed process. In re King, 801 F.2d 1324, 231 USPQ 136 (Fed. Cir. 1986)." Furthermore, it would have been obvious to one of ordinary skill in the art to modify TS in view of Browning to perform

routine experimentation with the spray coating parameters to optimize coating adhesion, for example, as suggested by Kang, in order to provide the optimum coating conditions, as Kang teaches that this is a well known customary practice in the art, and therefore, the optimization of the spray coating parameters would in turn result in the optimizing of the applied particle area range to a range within the claimed range, as variations in the applied particle area would occur as a result of the parameter adjusting. (1) It further would have been obvious to modify TS in view of Browning and Kang to provide that the roughening is performed by a grinding tool as suggested by EITHER Maros OR Tenkula in order to provide a desirable roughening, because TS provides desirable roughening conditions before thermal spraying, describing grit blasting, and both Maros and Tenkula teach that grinding can be used as well as grit blasting to perform desired pre-thermal spraying roughening. As to the tool, a grinding process would necessarily have to be provided with a tool to do the described grinding. As to the exact roughness used, TS teaches a range overlapping the claimed range, and In the case where the claimed ranges “overlap or lie inside ranges disclosed by the prior art” a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976).

8. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over TS in view of Browning, Kang and EITHER Marcos OR Tenkula as applied to claims 13 and 22-25 above, and further in view of Cole et al (US 5407035).

TS in view of Browning, Kang and EITHER Marcos OR Tenkula teach all the features of this claim except the pattern of marks from the grinding tool.

However, Cole teaches that before thermal spraying, a substrate surface is desirably roughened to increase adhesion. Column 2, line 65 through column 3, line 20. The roughening can be by blasting or by machining or grinding to provide a pattern such as a fine saw tooth pattern of machining grooves in a roughness of 100-1000 microinches (2.5 to 25.4 microns). Column 3, lines 1-10.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify TS in view of Browning, Kang and EITHER Marcos OR Tenkula to provide linear marks on the surface of the metal body when performing the grinding using a grinding tool as provided by Cole in order to provide good adhesion of the coating, as TS in view of Browning, Kang and EITHER Marcos OR Tenkula provides to perform grinding with a tool to roughen the surface before thermal spraying, and Cole further provides to form grooves when doing such grinding, which would provide a linear pattern. As to further crossing the grooves at the claimed angle of intersection, it would have been obvious to one of ordinary skill in the art that when performing the grooving as described by Cole, the specific pattern used would be such so as to provide the desired surface roughness of Cole, which would be optimized in that range for the specific article chosen. As a result, one of ordinary skill in the art would optimize the specific pattern of the grooving, including the crossing angle, to provide the desired roughness.

9. The Examiner notes that the reference to Maros et al appears on the PTO-892 as "GEORGE MAROS FRANK; et al".

Response to Arguments

10. Applicant's arguments filed September 15, 2008 have been fully considered but they are not persuasive.

As to the 35 USC 103 rejections to the claims, the Examiner has noted applicant's arguments as to the benefits of using the specific range of the particle area, and how applicant teaches that if the average area of each molten particles is smaller or larger than the claimed range that sufficient adhesion strength cannot be obtained. The Examiner has accepted this as a showing of the unexpected benefits for that range for the thermal spraying process that uses plasma spraying (as in claim 14), as applicant's showings are specifically as to plasma spraying (see the abstract, paragraphs [0023], [0024], [0026] of the specification). Applicant has not made the showing as to other forms of thermal spraying, such as gas flame spraying, and claim 13 simply provides for "thermal spraying". A showing of unexpected benefits must be commensurate in scope to what is claimed, see MPEP 716.02(d). The Examiner notes that in paragraph [0026] of the specification, for example, it seems to indicate that arc spraying and gas flame spraying do not provide the features of the invention as to particle size, and paragraph [0025] also discusses different features required by gas flame spraying.

Therefore, since a showing of unexpected benefits has not been made as to thermal spraying in general, the suggestion to optimize as discussed in the rejection above as to claim 13 and the other claims that do not require thermal spraying remains.

As to the discussion of Browning and Kang by applicant, the Examiner notes that Browning does not provide that the resulting particle area **MUST** be the same. However, it is capable of providing this particle area, and when used, particle area of some measurement must result on the substrate. Therefore, when used, the possible particle area that results would be in a range that includes that claimed. Furthermore, since Kang provides optimizing coating conditions to increase adhesion, it would have been obvious to optimize the spraying conditions when using Browning and the surface roughness ranges taught by TS and grinding by Maros or Tenkula, which would result in spraying conditions that would be in the range of applicant's (since the optimum adhesion would be in applicant's particle area ranges). As to Kang referring to particles of 25 micron in diameter, with area of 500 square microns, the Examiner is unsure of what applicant means. If applicant is referring to the starting particle size of Example 1, this refers to the particle size before impact with the surface, and on impact it would form a spread out splat as shown in the figures of the present application. It is unclear where the area is being calculated from. The Examiner notes that Kang refers to a wide variety of starting particle sizes (such as between 5-200 microns, column 7, lines 40-45). In any case, Browning provides a range that would be inclusive of particle size.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:00-3:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy H. Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Katherine A. Bareford/
Primary Examiner, Art Unit 1792